Statement of Alan P. Zelicoff
Senior Scientist
Sandia National Laboratories

United States House of Representatives
Committee on Government Reform
Subcommittee on National Security, Veterans Affairs,
and International Relations

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Mr. Chairman and members of the Subcommittee:

I am honored by this opportunity to address you today. Since the Committee's time is precious, I will briefly fill you in on my background and then get right to the items you have asked me to address.

I work in the Center for National Security and Arms Control at Sandia National Laboratories, one of the three Department of Energy weapons laboratories, but charged with a broad list of tasks addressing national security outside the realm of nuclear weapons per se. My center, in which I am one of two senior scientists, has had considerable experience in the primary research and development of a wide array of verification technologies for use in most of the existing multilateral and bilateral arms control treaties to which the United States is a signatory. We are also deeply involved in the day-to-day analysis of data of relevance to those treaties, and provide technical support to both international and national bodies responsible for the implementation and monitoring of the Chemical Weapons Convention, all nuclear treaties (including the Limited Test Ban Treaty, Threshold Test Ban Treaty, and Comprehensive Test Ban), and the Biological Weapons Convention. In particular, Sandia designed and carried out the most extensive of all of the mock trial inspections for the Biological Weapons Convention, following its participation in similar studies pre-dating the final negotiations and signatures on the Chemical Weapons convention.

The Committee has heard before, from Mr. Mahley and others, of the problematic differences between verification of the Chemical Weapons Convention and putative verification of the Biological Weapons Convention (BWC). I will not repeat those important distinctions, but will refer to them in some detail as I respond to the Committee's charge. In so doing, I will try to provide a technical, as opposed to a political, reference point. I am quite sure you get more than enough politicized information; as a scientist,

I will endeavor to highlight some objective data and observations that I hope will assist you in your work.

First, the Committee has asked how the United States developed verification policy for the BWC Protocol:

We began well enough—and I believe in a highly credible way—with a series of surveys of experts to identify potential unique and problematic aspects of inspections in support of the Biological Weapons Convention, followed by increasingly sophisticated mock inspection exercises based on the questions raised during those surveys. These exercises, conducted at a vaccine manufacturing facility, a Department of Defense biological weapons defense laboratory, a university medical school, the most advanced aerosol-biology facility in the United States, and at an explosives testing facility—all of obvious relevance to any BWC monitoring protocol—constitute the entirety of the U.S. experience in testing measures such as "challenge inspections," "compliance assurance," and "familiarization visits"—in other words, more or less the compendium of approaches advocated for strengthening the Convention by various countries involved in the BWC protocol negotiations.

In my technical opinion, these "trial" inspections constitute as well the entirety of scientifically designed, well-controlled investigations into the utility of various measures done anywhere by anyone. And here I would like to issue a caution: When you hear claims that other "trial inspections" for the BWC resulted in successful demonstration of items such as "managed access," "compliance checking," and "declaration validation," be just a bit skeptical. To the best of my knowledge, none—and I mean none—of these so-called mock inspections meet any of the scientific requirements of trial experiments, and none (save some of those that I describe as part of the U.S. Government effort) have been published with their methodologies, hypotheses, and analyses intact for all to see. Trial inspections are difficult and expensive to execute properly. It is all too easy to construct a trial and populate it with hand-picked participants to get the answer one wishes to hear. We can do—and did do—better than this.

The U.S. trials' outcomes were clear. Only two measures—challenge inspections and disease outbreak surveillance and investigation—resulted in information that was useful for monitoring or strengthening the BWC. Other oft-touted measures such as "declaration checking" resulted in so much ambiguous data that the inspection teams left the sites convinced that legitimate activities were covers for biological weapons activities.

There is no mystery in this: most of the activities in the daily work of pharmaceutical and bio-defense facilities, and even medical school microbiology laboratories, are

indistinguishable from activities that might be prohibited by the BWC. Conversely, illicit work that might be done in similar places is easily hidden. At the moment, our technology does not provide us with diagnostic tests that can separate evil intent from legal, perfectly permissible processes and procedures, except in the case of challenge inspections, for a specific set of reasons. To be concrete, a random visit to a modern pharmaceutical facility would be unlikely to uncover prohibited activities even if they existed, because of the size and multiplicity of processes taking place. Rather, the very acts of genetic engineering, large-scale fermentation, and the entire array of standard operating procedures will meet any expectations pre-formed in eye of the beholder. On the other hand, if a specific allegation were to be leveled (production of large quantities of anthrax, for example, at a specific place and time) there is reasonable chance that the illegal activity would be unveiled, assuming that access was granted in a timely fashion. Also, the tools of modern epidemiology are such that should an odd disease outbreak take place, it is likely that investigators could (again, with proper access) distinguish between a natural event or one of man-made origin.

Despite these valuable results, the process of policy development within U.S. Government Protocol negotiations soon faltered. It is a not-very-well-kept secret that there was intense friction between the National Security Council and the entirety of the Interagency Working Group on Biological Weapons control throughout the past eight years while policy was under development. Essentially nothing in the way of tangible policy was put forward during this time, because one or at most a few low-level staffers within the NSC sought to suppress the results of the mock inspections, break interagency consensus on negotiating strategy, and impose an extraordinarily ill-suited vision for the BWC Protocol, which was: Make it like the Chemical Weapons Convention protocol. Nothing could be more wrong-headed, for all of the reasons that you have heard in last September's testimony, and nothing could be more destructive for the future of the BWC. There is no question that there was a complete absence of serious Administration attention to the negotiations taking place in Geneva; otherwise the grating questions about goals and tactics that haunted all members of the delegation for all of the past eight years would have been resolved. That low-level NSC functionaries were able to force gridlock speaks volumes about the lack of leadership for and periodic review of the U.S. negotiating stance throughout most of the 1990s.

This brings me to the second question raised by the Committee: What is the ability of the Chairman's text to detect and deter rogue nation and terrorist biological weapon (BW) activity? The answer is: very little, and the reasons are simple. The vast majority

of effort envisioned in the Chairman's text is directed at routine, random visits to sites around the world—most in the West, the plurality in the United States—for purposes of checking on declarations of items and stocks which are in and of themselves highly fluid. It was these very types of visits that were simulated in some of the U.S. trials—three of them in Albuquerque, with which I am intimately familiar—and that were the source of confusion and actual *undermining* of confidence in compliance. Challenge inspections can be blocked by a simple majority of States Parties, and there are a series of roadblocks in front of those measures likely to be most fruitful: timely investigation of disease outbreaks. Without unobstructed operation of these items, the real substance of the text is fatally weakened.

It is important to note that the U.S. delegation expended very little capital in the Geneva debates promoting enhanced disease monitoring for the BWC. And once again, the NSC broke consensus on even the utility of disease monitoring within the inter-agency working group—a most unusual state of affairs, as long-standing interagency rules specify that the NSC intervenes in policy disputes only when consensus among executive agencies cannot be achieved. Sadly, abrogation of this understanding cost the U.S. delegation any chance of unifying to significantly influence the outcome of the debates in Geneva, including those taking place within the Western Group. Most substantively, we were forbidden—yes, forbidden—to present the results of the U.S. trial inspections, even after other countries introduced data from scientifically flawed trials. A leadership vacuum resulted, quickly filled by opinions and beliefs, rather than experience and hard-won information. In the end, pro-forma arms control, the least-common denominator in the multi-lateral forum, filled the void and the bulk of the Chairman's text.

Because of its focus on declarations of facilities that would be very unlikely to engage in illegal activities, followed by random visits to those facilities, it is clear that the Chairman's text would not improve the verifiability of the BWC. Indeed, the very notion of "verification" became a political stalking horse—instead of a substantive issue—for various interests, non-government organizations included, throughout the Geneva process. The U.S. had, at least at one time, a rather clear view of standards for "verification." While no agency will give you a precise definition of the term, I believe it is fair to say that the minimalist notion would include a "more probable than not" standard, i.e., that any measure or set of measures would have to have more than a random level of likelihood to identify non-compliance (or perhaps "militarily significant"

non-compliance) before it would meet verification requirements, while at the same time avoiding false accusations or conclusions.

Oddly, the meaning of this key concept—"verification"—received almost no attention in Geneva in recent years. In the early portion of the negotiations in 1991 and 1992 and when U.S. policy was less confused, the delegation was able to foster meaningful debate about "verifiability" standards. Indeed, the U.S. position on the need for measures to meet at least *some* substantive standard led to the early "verification experts group" (VEREX) to remove nearly all references to the word "verification" in their final report, and speak instead of measures to "strengthen" the BWC. Subsequent unresolved bickering between the NSC and the rest of the Interagency removed any possibility that the U.S. delegation could continue to advocate scrutiny of proposed BWC measures based on the verification standard—a great loss, and a waste of precious negotiating time. And some groups, such as the Federation of American Scientists (FAS) Working Group on Biological Weapons, assert that verification is possible, conveniently ignoring the U.S. government's mock inspection data, while having none of their own to share. Nonetheless, FAS members appear at every negotiating session to conduct seminars on verification for delegates. Such is the outcome from failure of the U.S. to guide the formal negotiations based on facts rather than on beliefs.

Mr. Chairman, I do not suggest that the U.S. trial inspection work constitutes a sufficiently large experience to draw final conclusions about measures that may, with further work, be crafted in a way to strengthen the BWC. Rather, when combined with the reports of the United Nations Special Commission (UNSCOM) inspections of Iraqi BW sites, the analysis of this set of information leads me to question the standard tenets of arms control in the context of biological weapons. Frequent visits to check declarations are not necessarily better than challenge inspections alone. Declaring collections of micro-organisms whose functionality can easily be changed from a pre-determined list is arguably worse than no information at all. Doing *something* should never be confused with doing something *useful*. Verification advocates, especially those in the scientific community, have a responsibility to carefully test their assertions. It is noteworthy that the Congress had sufficient insight to mandate several years ago more trial inspections. Yet, the Administration just passed ignored this requirement, almost certainly because BWC verification proponents within the NSC did not want to learn any lessons from such inspections.

But the end result need not be tragic. There are at least two areas where all States Parties share immediate interests: technical cooperation in the identification and

mitigation of infectious disease; and swift punishment for countries that employ biological weapons or support terrorist groups that seek to acquire them.

Infectious disease continues to be the leading cause of death and economic loss throughout the world. Tuberculosis (including multi-drug resistant TB), new influenza strains, AIDS, foot-and-mouth disease in animals, and novel hemorrhagic fevers (most of which were unknown until a few years ago) are clear dangers to the vitality of nations, and in some cases their very survival. Most of these diseases can not be treated, only prevented. Yet we have almost no understanding of their sources and mechanisms of spread. The simplest of reporting systems, based in clinics and hospitals around the world and linked through low-speed Internet connections would begin a new era in the control of these scourges. The cost of such a data–sharing system is very modest, but the knowledge gained is actionable and invaluable to all. The States Parties to the BWC should establish this network as a substantive demonstration of the importance of Scientific and Technical exchange, emphasized so strongly in the Convention. The United States would do well to promote and fund a large share of this system, paying for several thousand computers and Internet links in medically under-served areas of the world, and linking in clinics and hospitals in the West as well. The investment, probably in the range of $100 million over a decade, would salvage U.S. credibility in the BW non-proliferation arena, particularly if the Bush Administration abjures support for the Chairman's text.

On rare (but important) occasions, the network would also identify the emergence of unusual disease (unusual, that is, in either scope or symptoms) that may represent either the use of a biological agent for hostile purposes, or an experiment with a weapon gone awry. There is little doubt that the techniques of modern epidemiology could identify the source of the disease, and distinguish between a natural focus and intentional introduction of organisms or toxins.

The negotiations on a Protocol for the BWC have failed to produce a document that strengthens the Convention or increases the security of its member States Parties. We must await new technologies in order to verify nonproliferation of biological weapons. Only a political sea change will permit the elimination of existing (some would say "discriminatory") export controls, and the current turmoil in Russia makes it unlikely that the largest biological weapons program in the world can come under control, Protocol or not. But nations of good will can immediately address the pervasive problems of infectious disease, and the BWC provides the best possible forum for meeting that need.